CLAIMS

What is claimed is:

1.   A method of testing a cable network, using one or more cable modems on the cable network, while allowing live data traffic, the method comprising:

(a)   identifying a group of time increments during which cable modems on the network are not scheduled to transmit data;

(b)   instructing a first one of the one or more cable modems to send a first signal of a first frequency at a first power during a first one of the time increments;

(c)   measuring the power of the first signal received at a specified location on the cable network;

(f)   (d)   instructing the first cable modem to send a second signal of a second frequency during an available time increment;

(e)   measuring the power of the second signal received at the specified location on the cable network; and

(f)   recording a power versus frequency spectrum of the first modem at at least the first and second frequencies.

2.   The method of claim 1, further comprising, at the specified location, measuring the power of a plurality of additional signals generated by the first cable modem at a plurality of additional frequencies.

3.   The method of claim 2, wherein the plurality of additional signals generated by the first cable modem are sent during a plurality of additional time increments.

4.   The method of claim 1, further comprising, at the specified location, measuring and recording a frequency versus power spectrum of a second one of the cable modems during available time increments.

5.   The method of claim 1, further comprising;

(i)   determining a deviation between the measured power of the first signal, at the specified location, and an expected value of the measured power at that location;
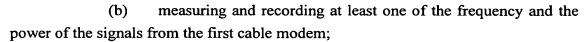
(ii)   instructing the first cable modem to send another signal at the first frequency, but this time at a power adjusted from the first power by the magnitude of the deviation; and

(iii)   measuring and recording the power of the other signal, at the specified location on the cable network.

6.   The method of claim 5, further comprising repeating (i)-(iii) a number of times to obtain statistical data.

7.   The method of claim 1, wherein the testing determines whether the cable network is in compliance with a cable network standard.

8.   The method of claim 1, wherein the testing determines whether the cable network meets DOCSIS requirements, and wherein instructing the first cable modem to send a first signal comprises sending a DOCSIS ranging request to the first cable modem.

9.   The method of claim 1, comprising identifying a range of frequencies at which the one or more cable modems are to send signals.

10.   The method of claim 9, wherein the range of frequencies spans at least a substantial portion of the upstream frequency bandwidth allotted to cable modems.

11.   The method of claim 9, wherein the range of frequencies includes one or more frequencies in a frequency sub-band over with cable modems on the cable network are currently sending data.

12.   The method of claim 1, wherein the one or more cable modems are selected by a method comprising:

identifying separate geographic regions of the cable network for testing; and
selecting at least one cable modem at each geographic location.

13.   A method of testing a cable network while allowing live data traffic, the method comprising:

(a)   instructing a first cable modem to send signals of a defined frequency and power during a first group of time increments at which times cable modems on the network are not scheduled to transmit data;

(b)   measuring and recording at least one of the frequency and the power of the signals from the first cable modem;

(c)   instructing a second cable modem to send signals of a defined frequency and power during a second group of time increments at which times cable modems on the network are not scheduled to transmit data; and

(d)   measuring and recording at least one of the frequency and the power of the signals from the second cable modem.

14.   The method of claim 13, wherein the signals from the first and second cable modems are measured at a single specified location on the cable network.

15.   The method of claim 13, wherein the testing determines whether the cable network is in compliance with requirements of DOCSIS.

16.   The method of claim 13, comprising identifying a range of frequencies at which the first and second cable modems are to send signals.

17.   The method of claim 16, wherein the range of frequencies spans at least a substantial portion of the upstream frequency bandwidth allotted to cable modems.

18.   The method of claim 16, wherein the range of frequencies includes one or more frequencies in a frequency sub-band over with cable modems on the cable network are currently sending data.

19.   A cable network headend allowing testing of the cable network, the headend comprising:

(a)   an amplitude detector that can measure, at a specified location in the cable network, the amplitude of a signal received from a cable modem in the cable network;

(b)   a MAC layer means for identifying a group of time increments during which cable modems on the cable network are not scheduled to transmit data; and

(c)   test logic means for instructing a cable modem on the cable network to send signals at at least two different frequencies during one or more of the time increments and for directing the headend to record the power of said signals at said different frequencies as detected by the amplitude detector.

20. The headend of claim 19, further comprising an upstream receiver in communication with the amplitude detector; and

a downstream transmitter in communication with the MAC layer means.

21. The headend of claim 19, wherein the test logic means selects one or more cable modems in the cable network to generate signals at multiple frequencies.

22. The headend of claim 21, wherein the test logic means selects multiple cable modems and the individual selected cable modems reside at separate geographic regions.

23. The headend of claim 19, wherein at least one of the frequencies at which the cable modem sends signals is within a frequency band over which cable modems on the cable network are currently sending data.

24. The headend of claim 19, wherein the test logic means determines from one or more power versus frequency spectra of one or more of the cable modems in the cable network whether the cable network complies with a cable network standard.

25. A cable network headend allowing testing of the cable network, the headend comprising:

(a) an amplitude detector that can measure, at a specified location in the cable network, the amplitude of a signal received from a cable modem in the cable network;

(b) one or more processors configured to (i) identify a group of time increments during which cable modems on the cable network are not scheduled to transmit data and (ii) to generate instructions to cause specific cable modems on the cable network to transmit signals of specified power and frequency, which signals can be measured by the amplitude detector; and

(c) memory coupled to the one or more processors and storing power and frequency data for the specific cable modems.

26. The cable network headend of claim 25, further comprising a modulator/transmitter and a demodulator/receiver.

27. The cable network headend of claim 25, wherein the power and frequency data are power versus frequency spectra over a range of upstream transmission frequencies for the specific cable modems.

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